# Solubility

***Soluble Salts***

1. The $Na^+$, $K^+$, and $NH_4^+$ ions form *soluble salts. Thus, NaCl, $KNO_3$, $(NH_4)_2SO_4$, $Na_2S$, and $(NH_4)_2CO_3$ are soluble.*
2. The nitrate ($NO_3^-$) ion forms *soluble salts. Thus, $Cu(NO_3)_2$ and $Fe(NO_3)_3$ are soluble.*
3. The chloride ($Cl^-$), bromide ($Br^-$), and iodide ($I^-$) ions generally form *soluble salts. Exceptions to this rule include salts of the $Pb^{2+}$, $Hg_2^{2+}$, $Ag^+$, and $Cu^+$ ions. $ZnCl_2$ is soluble, but CuBr is not.*
4. The sulfate ($SO_4^{2-}$) ion generally forms *soluble salts. Exceptions include $BaSO_4$, $SrSO_4$, and $PbSO_4$, which are insoluble, and $Ag_2SO_4$, $CaSO_4$, and $Hg_2SO_4$, which are slightly soluble.*

***Insoluble Salts***

1. Sulfides ($S^{2-}$) are usually *insoluble. Exceptions include $Na_2S$, $K_2S$, $(NH_4)_2S$, MgS, CaS, SrS, and BaS.*
2. Oxides ($O^{2-}$) are usually *insoluble. Exceptions include $Na_2O$, $K_2O$, SrO, and BaO, which are soluble, and CaO, which is slightly soluble.*
3. Hydroxides ($OH^-$) are usually *insoluble. Exceptions include NaOH, KOH, $Sr(OH)_2$, and $Ba(OH)_2$, which are soluble, and $Ca(OH)_2$, which is slightly soluble.*
4. Chromates ($CrO_4^{2-}$) are usually *insoluble. Exceptions include $Na_2CrO_4$, $K_2CrO_4$, $(NH_4)_2CrO_4$, and $MgCrO_4$.*
5. Phosphates ($PO_4^{3-}$) and carbonates ($CO_3^{2-}$) are usually *insoluble. Exceptions include salts of the $Na^+$, $K^+$, and $NH_4^+$ ions.*